

REMARKS

Amendments to Claims

1. Minor clerical omissions have been corrected in claims 1 and 14.

Claims 3 and 5 have been rewritten in independent form. The scopes of these claims have not been changed.

Claims 16 through 33 are new claims added to more particularly describe additional embodiments of the invention. Support for these claims can be found in claims 4 through 15.

35 U.S.C. § 103

2. The Examiner rejected claims 1-9 and 12-15 under 35 U.S.C. § 103(a) as being unpatentable over Merck et al. (U.S. Patent No. 4,740,580).

The Examiner has the burden of proving that Merck et al. teaches or suggests every limitation of the presently rejected claims. Thus to reject claim 1, the Examiner must identify a suggestion in Merck et al. of a composition involving "1,3-propanediol" and "85 to 96 wt% of a polyester resin" in combination with "4 to 15 wt% of a triglycidyl isocyanurate crosslinking agent" as recited in claim 1. In the Office Action dated September 25, 2002, the Examiner stated that "[t]he reference teaches powder coating compositions comprising a polyester made from terephthalic acid and neopentyl glycol with another aliphatic diol, and glycidyl isocyanurate having improved mechanical properties. See examples." Applicants assume that the Examiner in maintaining the present rejections over Merck et al. based the rejections in part upon Example 6 of Merck et al. wherein 63.6 parts by weight of polyesters from other examples of Merck et al. were combined with 2.7 parts by weight of triglycidyl isocyanurate. While the combination of 63.6 parts by weight of polyester with 2.7 parts by weight of triglycidyl isocyanurate does result in a composition having approximately 96 wt% polyester and approximately 4 wt% triglycidyl isocyanurate, ignoring other components in the powder compositions of Example 6 in Merck et al., the polyesters used in the examples of Merck et al. are all made using ethylene glycol. The examples in Merck et al. do not mention 1,3-propanediol, as recited in claim 1, and the Examiner has pointed to no other disclosure of Merck et al. which teaches "85 to 96 wt% of a polyester resin" in combination with "4 to 15 wt% of a triglycidyl isocyanurate crosslinking agent" as recited in claim 1.

3. The Examiner rejected claims 1-3, 5-10 and 12-15 under 35 U.S.C. § 103(a) as being unpatentable over Marsiat (U.S. Patent No. 4,085,159).

The Examiner has the burden of proving that Marsiat teaches or suggests every limitation of the presently rejected claims. In the Office Action dated September 25, 2002, the Examiner stated that "[t]he

reference teaches powder coating compositions comprising a polyester made from terephthalic acid and isophthalic acid with neopentyl glycol and another aliphatic diol, and glycidyl isocyanurate having improved properties. See Example 6.” Example 6 of Marsiat describes a combination of 1000 parts by weight of polyester with 110 parts by weight of triglycidyl isocyanurate. Applicants assume that the Examiner in maintaining the present rejection of claim 1 over Marsiat relied upon Example 6 of Marsiat in attempting to satisfy the Examiner’s burden of proving that Marsiat teaches “85 to 96 wt% of a polyester resin” in combination with “4 to 15 wt% of a triglycidyl isocyanurate crosslinking agent” as recited in claim 1. While a combination of 1000 parts by weight of polyester with 110 parts by weight of triglycidyl isocyanurate does result in a composition having approximately 90 wt% polyester and approximately 10 wt% triglycidyl isocyanurate, ignoring other components in the powder compositions of Example 6 in Marsiat, the polyesters used in the examples of Marsiat are all made using ethylene glycol. The examples in Marsiat do not mention 1,3-propanediol, as recited in claim 1, and the Examiner has pointed to no other disclosure of Marsiat which teaches “85 to 96 wt% of a polyester resin” in combination with “4 to 15 wt% of a triglycidyl isocyanurate crosslinking agent” as recited in claim 1.

4. Applicants asserted in the December 19, 2002, Response to the Office Action of September 25, 2002, that the differences between the materials of the present claims and the materials of Merck et al. and Marsiat would tend to lead one of ordinary skill in the art to believe that the materials of Merck et al. and Marsiat would be more flexible than the materials of the present claims. In that Response, Applicants also pointed out that contrary to these expectations of the person of ordinary skill in the art, the materials of the present claims are substantially more flexible than the materials of Merck et al. and Marsiat. Applicants direct the Examiner’s attention to that Response of December 19, 2002, and maintain that this observed trend in flexibility, which is contrary to expectations, proves that there is a nonobvious difference between the materials of the present claims and the materials of Merck et al. and Marsiat.

5. Applicants further assert that claims 1, 3, 5, and 14 are patentable over Merck et al. and Marsiat for reasons independent of reasons previously discussed. Claim 1 includes the limitation “a polyester resin formed by reacting a mixture of aliphatic glycols and one or more dicarboxylic acids, wherein the mixture of aliphatic glycols comprises from 5 to 90% on a molar basis 1,3-propanediol.” Claim 3 includes the limitation “a polyester resin formed by reacting a mixture of aliphatic glycols and one or more dicarboxylic acids, wherein the mixture of aliphatic glycols comprises from 5 to 90% on a molar basis 1,3-propanediol, wherein the aliphatic glycol in the mixture of aliphatic glycols which is not 1,3-propanediol is neopentyl glycol.” Claim 5 includes the limitation “wherein the mixture of aliphatic glycols comprises from 15 to 50% on a molar basis 1,3-propanediol, wherein the aliphatic glycol in the mixture of aliphatic glycols which is not 1,3-propanediol is neopentyl glycol.” Claim 14 recites the limitation “a polyester resin . . . formed by reacting a mixture of aliphatic glycols comprising 15-50% on a molar basis 1,3-propanediol and the balance neopentyl glycol.”

Pages 8-21 of the present application contain examples involving polyester resins formed by reacting mixtures of 1,3-propanediol and neopentyl glycol. These examples demonstrate the criticality of the ranges in claims 1, 3, 5 and 14. Meanwhile, neither Merck et al. nor Marsiat specifically mentions the ranges "5 to 90%" or "15-50%" as in claims 1, 3, 5 or 14. Neither reference cited by the Examiner expressly designates any ranges specifically for 1,3-propanediol, such as "5 to 90%" or "15-50%" (the ranges recited in claims 1, 3, 5 or 14) or some narrower range falling within 5 to 90% or 15 to 50%. In fact, in each of Merck et al. and Marsiat the only mention of 1,3-propanediol occurs briefly within a list of many possible choices of alternative compounds. (See column 3, line 36, in Merck et al. and column 3, line 54, in Marsiat.) Neither Merck et al. nor Marsiat expresses any preference for 1,3-propanediol over some other listed alternative, and neither Merck et al. nor Marsiat reveals any advantage of including 1,3-propanediol at all.

In the examples of the present application, polyesters were made using neopentyl glycol / 1,3-propanediol molar percentage compositions of 100/0, 85/15, 70/30, 50/50, and 0/100. Details of these compositions are provided in Table 1 on page 9 of the present application. Powder coatings were prepared using these polyesters. Table 2 on page 10 of the present application, as amended, contains details of the powder coating compositions. Various coating properties were then evaluated to compare the performance of the resins made using both 1,3-propanediol and neopentyl glycol (according to the present invention and the claimed ranges) against the resins made using neopentyl glycol as the only glycol (0% 1,3-propanediol, which is outside the claimed ranges, for comparative purposes).

Applicants direct the Examiner's attention to pages 14-16 of the present application. These pages and Table 8 contained therein, as amended, contain results of impact resistance testing. The results show that resins made using both 1,3-propanediol and neopentyl glycol (according to the present invention and the claimed ranges) exhibited significantly improved flexibility and impact resistance in comparison to resins made using neopentyl glycol as the only glycol (0% 1,3-propanediol, which is outside the claimed ranges). Page 17 of the present application and Table 9, included therein, contain descriptions and results of conical mandrel bend and T-bend tests, which results also demonstrate the improved flexibility of resins made using both 1,3-propanediol and neopentyl glycol (according to the present invention and the claimed ranges) in comparison to resins made using neopentyl glycol as the only glycol. Finally, Table 7 on page 14 of the present application contains data suggesting that the flow properties of the powder coatings improve with increasing use of 1,3-propanediol.

The examples of the present application also provide evidence that the aforementioned improved properties, related to the use of both 1,3-propanediol and neopentyl glycol in accordance with the present invention, can be obtained without sacrificing other desirable properties of powder coatings. Data in the examples of the present application shows that powder coatings produced according to the present invention and the claimed ranges, while exhibiting the aforementioned improved properties, also exhibit other important properties that are desirably competitive with properties of the powder coatings made using neopentyl glycol as the only glycol. Examples of these properties are: reactivity (page 12, Table 4, of the present application); processibility (pages 12-13, Table 5); storage stability, which requires sufficiently high

glass transition temperatures (page 13, Table 6); gel time reactivity (page 14, Table 7); gloss (page 17, Figure 5); hardness and adhesion (pages 17-18, Table 10); chemical and stain resistance (pages 18-19, Table 11); water resistance and salt spray corrosion resistance (pages 19-20, Table 12); and yellowing resistance after overbaking (pages 19-20, Table 13). These properties are relatively unaffected by the features of the present invention that provide the previously discussed significant improvements and when tested in the present invention are comparable with properties of the powder coatings made using neopentyl glycol as the only glycol.

In summary, the data of the examples in the present application demonstrates that when 1,3-propanediol and neopentyl glycol are used in powder coatings in accordance with the present invention and the presently claimed ranges, great improvements in certain properties are observed relative to the properties of powder coatings made using neopentyl glycol as the only glycol. Meanwhile, the data of the examples of the present application demonstrates that in obtaining those benefits of the present invention and the presently claimed ranges, also achieved is the retention of other desirable properties seen in the powder coatings made using neopentyl glycol as the only glycol. Again, claims 1, 3, 5 and 14 relate to the examples of the present application involving neopentyl glycol and 1,3-propanediol in the claimed ranges. The references cited by the Examiner do not identify the ranges of claims 1, 3, 5 or 14, do not specifically designate any compositional ranges for 1,3-propanediol, and furthermore do not reveal any benefit at all associated with using 1,3-propanediol. In contrast, the examples of the present application demonstrate significant benefits associated with the use of 1,3-propanediol and the ranges of claims 1, 3, 5 and 14 for 1,3-propanediol.

In light of results shown in the examples of the present application which demonstrate the criticality of the claimed ranges for 1,3-propanediol, Applicants assert that claims 1, 3, 5 and 14 are patentable, independently of any other remarks submitted herewith, over Merck et al. and Marsiat.

6. In light of the remarks herein, Applicants respectfully request reconsideration and withdrawal of the rejections under 35 U.S.C. § 103(a) of claims 1, 3, 5, and 14. Because all other claims in the present application depend from one of claims 1, 3, 5 or 14, Applicants also respectfully request that these dependent claims be passed to allowance.

Fees

As a result of the present amendments, 33 claims are now pending in this application, including 4 independent claims. Please charge \$318.00 to Shell Oil Company, Deposit Account 19-1800, for one independent claim in excess of three and for 13 claims in excess of 20. If any other fees are required for acceptance of this filing, please charge the required fees to Shell Oil Company, Deposit Account 19-1800.

Each of the rejections having been traversed, allowance of the claims of the present application is respectfully requested. If the Examiner would like to discuss this case with Applicants' attorney, the Examiner is invited to contact Donald F. Haas at the phone number below.

Respectfully submitted,

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